

WHAT IS CLAIMED IS:

1. An electrochemical cell comprising a cathode, an anode, a current collector including aluminum, an electrolyte containing a perchlorate salt and a second salt, wherein the electrochemical cell is a secondary cell, and wherein the electrolyte is essentially free of LiPF_6 .
2. The cell of claim 1, wherein the electrolyte contains at least 5000 ppm by weight of a perchlorate salt.
3. The cell of claim 2, wherein the electrolyte contains at least 10,000 ppm by weight of a perchlorate salt.
4. An electrochemical cell comprising a cathode containing MnO_2 , an anode containing lithium, and an electrolyte containing a perchlorate salt, wherein the cell includes an aluminum surface in electrical contact with a second metal surface, wherein the second metal surface is different than the aluminum surface.
5. The cell of claim 4, wherein the second metal surface is a steel surface.
6. The cell of claim 4, wherein the second metal surface is a stainless steel surface.
7. The cell of claim 4, wherein the second metal surface is an aluminum or aluminum alloy surface.
8. The cell of claim 4, wherein the second metal surface is a nickel surface.
9. The cell of claim 4, wherein the cell includes a cathode current collector comprising aluminum.

10. The cell of claim 4, wherein the electrolyte contains about 500 to about 2500 ppm by weight of the perchlorate salt.
11. The cell of claim 4, wherein the perchlorate salt is LiClO_4 .
12. The cell of claim 4, wherein the perchlorate salt is $\text{Ca}(\text{ClO}_4)_2$.
13. The cell of claim 4, wherein the perchlorate salt is $\text{Ba}(\text{ClO}_4)_2$.
14. The cell of claim 4, wherein the perchlorate salt is $\text{Al}(\text{ClO}_4)_3$.
15. The cell of claim 4, wherein the electrolyte is essentially free of LiPF_6 .
16. The cell of claim 4, wherein the aluminum surface is a portion of an object having at least one dimension greater than 0.5 mm.
17. The cell of claim 4, wherein the aluminum surface is a portion of an object having at least one dimension greater than 1 mm.
18. The cell of claim 4, wherein the aluminum surface is a portion of an object having at least one dimension greater than 2 mm.
19. An electrochemical cell comprising a cathode containing an aluminum current collector, an anode, and an electrolyte containing a lithium salt and a perchlorate salt, wherein the cell is a primary electrochemical cell.
20. The cell of claim 19, wherein the cathode contains MnO_2 .
21. The cell of claim 19, wherein the anode contains lithium.

22. The cell of claim 19, wherein the electrolyte contains at least 500 ppm by weight of the perchlorate salt.
23. The cell of claim 19, wherein the electrolyte contains at least 1000 ppm by weight of the perchlorate salt.
24. The cell of claim 19, wherein the electrolyte contains at least 1500 ppm by weight of the perchlorate salt.
25. The cell of claim 19, wherein the electrolyte contains at least 2500 ppm by weight of the perchlorate salt.
26. The cell of claim 19, wherein the electrolyte contains less than 20,000 ppm by weight of the perchlorate salt.
27. The cell of claim 19, wherein the perchlorate salt is LiClO_4 .
28. The cell of claim 19, wherein the perchlorate salt is $\text{Ca}(\text{ClO}_4)_2$.
29. The cell of claim 19, wherein the perchlorate salt is $\text{Ba}(\text{ClO}_4)_2$.
30. The cell of claim 19, wherein the perchlorate salt is $\text{Al}(\text{ClO}_4)_3$.
31. The cell of claim 19, wherein the cell includes a case comprising aluminum.
32. The cell of claim 31, wherein the case consists essentially of aluminum.
33. The cell of claim 19, wherein the electrolyte further comprises LiPF_6 .
34. The cell of claim 33, wherein the electrolyte contains at least 5000 ppm by weight LiPF_6 .

35. The cell of claim 34, wherein the electrolyte contains at least 10,000 ppm by weight LiPF_6 .

36. The cell of claim 19, wherein the electrolyte is essentially free of LiPF_6 .

37. An electrochemical cell comprising a cathode containing MnO_2 , an anode containing lithium, an aluminum surface, and an electrolyte containing about 500 ppm to about 2000 ppm by weight of a perchlorate salt.

38. The cell of claim 37, wherein the perchlorate salt is LiClO_4 .

39. The cell of claim 37, wherein the perchlorate salt is $\text{Ca}(\text{ClO}_4)_2$.

40. The cell of claim 37, wherein the perchlorate salt is $\text{Ba}(\text{ClO}_4)_2$.

41. The cell of claim 37, wherein the perchlorate salt is $\text{Al}(\text{ClO}_4)_3$.

42. An electrochemical cell comprising a cathode containing MnO_2 , an anode containing lithium, and an electrolyte containing a perchlorate salt, wherein the cell is a primary electrochemical cell, and wherein the cell includes two pieces of aluminum in electrical contact with each other.

43. A method of inhibiting aluminum corrosion in an electrochemical cell, the method comprising:

(a) adding a perchlorate salt to an electrolyte; and

(b) placing the electrolyte, an anode containing Li, and a cathode containing MnO_2 and an aluminum current collector into a cell case to form the cell, wherein the cell is a primary electrochemical cell.

44. The method of claim 43, wherein the perchlorate salt is LiClO_4 .

45. The method of claim 43, wherein the perchlorate salt is $\text{Ca}(\text{ClO}_4)_2$.
46. The method of claim 43, wherein the perchlorate salt is $\text{Ba}(\text{ClO}_4)_2$.
47. The method of claim 43, wherein the perchlorate salt is $\text{Al}(\text{ClO}_4)_3$.